



A **tyco** International Ltd. Company

**First Quarter (April) 2006  
Groundwater Monitoring Report  
Rose Township Demode Road Site  
913 Demode Road  
Holly, Michigan**

*Prepared For:*

Rose Township Settling Defendants  
800 Chrysler Drive  
Auburn Hills, MI 48326

*Prepared By:*

Earth Tech, Inc.  
36133 Schoolcraft  
Livonia, MI 48150

**August 23, 2006**

EPA Region 5 Records Ctr.



270675

August 23, 2006

Mr. Nabil Fayoumi  
United States Environmental Protection Agency  
Region 5, Superfund Division  
77 W. Jackson Boulevard (SR-6J)  
Chicago, Illinois 60604-3590

Re: **April 2006 Groundwater Monitoring Report  
Rose Township Demode Road Site  
913 Demode Road, Holly, Michigan 48440**

Dear Mr. Fayoumi:

On behalf of DaimlerChrysler Corporation, Earth Tech submits one copy of the April 2006 Groundwater Monitoring Report for the above-referenced site. If you have any questions regarding this report, please contact Ms. Rita Brenner of Earth Tech at (734) 779-2837.

Sincerely,

**EARTH TECH, INC.**



Rita Brenner  
Project Manager

cc: Mr. Chuck Graff, Michigan Department of Environmental Quality (MDEQ)  
Ms. Mary Schafer, MDEQ  
Mr. Rick Meischcsak, DaimlerChrysler Corporation

**First Quarter (April) 2006  
Groundwater Monitoring Report  
Rose Township Demode Road Site  
913 Demode Road  
Holly, Michigan 48442**

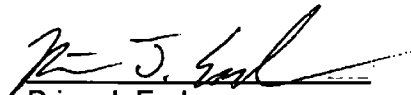
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## **1.0 INTRODUCTION**

This groundwater monitoring report documents field activities and analytical results from the April 2006 (First Quarter 2006) groundwater sampling activities conducted at the Rose Township Demode Road Site (Site), located at 913 Demode Road, Holly, Michigan (Figure 1). A total of 35 groundwater monitoring wells were purged and sampled between April 17 and 28, 2006, using either low-flow pumping methods or by use of natural artesian conditions. Groundwater level measurements were collected from 101 groundwater monitoring wells, 4 groundwater extraction wells, 8 piezometers, and 9 staff gauges on April 28, 2006. This report summarizes the methods and procedures used during the monitoring event and the analytical results obtained.

### **1.1 SITE DESCRIPTION AND BACKGROUND**

The Site is comprised of approximately 110 acres and is located in the northwestern corner of Oakland County. Regional topography consists primarily of broad flat plains with numerous shallow depressions and valleys occupied by lakes, ponds, wetlands, and streams. These plains are traversed by a series of southwest to northeast trending glacial end moraine ridges. The topography of Oakland County and all of southeastern Michigan is dominated by glacial features created during the retreat of the Saginaw lobe of the Laurentide ice sheet during the Wisconsin Glacial Stage (approximately 10,000 to 20,000 years ago). The regional elevation ranges from approximately 630 to 1,220 feet above mean sea level (ft AMSL). The area receives on average 30 inches of precipitation per year. Average monthly temperatures range from 23 °F (January) to 72 °F (July).

The Site was used as an unlicensed landfill for industrial wastes from the mid 1960s until approximately 1971 when Rose Township brought a second law suit against the waste hauler and the land owner. The illegal disposal activities were conducted on approximately 12 acres of the upland portion of the Site. In 1979 the Michigan Department of Environmental Quality (MDEQ), formerly the Michigan Department of Natural Resources (MDNR), conducted a drum survey of the property and identified approximately 1,500 drums on Site. A large number of these drums were severely deteriorated and had apparently released their contents. Based on

this survey and the subsequent sampling of the identified drums, a remedial response was conducted by the MDEQ to remove the drums. By July 1980, more than 5,000 drums were identified and removed from the Site by the MDEQ.

Since 1980, the Site has been the subject of numerous investigations and remedial response activities, as summarized below:

- 1980 to 1982 – Initial Site investigation conducted by the MDEQ.
- 1982 – Site becomes part of the Federal Superfund program. A Remedial Investigation/Feasibility Study (RI/FS) is initiated.
- 1986 – The MDEQ conducts additional groundwater delineation activities.
- 1987 – Cleanup plan selected. Record of Decision (ROD) issued requiring Incineration of PCB contaminated soil and extraction and treatment of contaminated groundwater with discharge to wetlands.
- 1989 - ROD Amendment #1 - Soil Flushing is added to the ROD as a soil remedy.
- 1992-1993 – Incineration of 50,000 cubic yards of polychlorinated biphenyl (PCB) contaminated soil.
- 1995 – ROD Amendment #2 – Soil vapor extraction (SVE) chosen for remaining contaminated soils. Target cleanup levels (TCLs) for volatile organic compounds (VOCs) in soil were also amended.
- 1995 – 1996 – Both SVE and groundwater extraction/treatment systems designed and constructed.
- 1997 – Earth Tech is subcontracted for the operation, maintenance, and monitoring (OM&M) of the Site.
- 2002 – Dissolved vinyl chloride concentrations detected beyond the groundwater system capture zone.
- 2004 – Dissolved vinyl chloride concentrations detected at northeast boundary of the Site. Earth Tech begins off-Site delineation activities.
- 2005-2006 – Hydrologic Study is conducted to determine the interaction between surface water and groundwater at the Site.

## **1.2 GEOLOGY/HYDROGEOLOGY**

The Site is located on a glacial end-moraine and represents a local topographic high and a recharge area for the shallow aquifer. Site topography ranges from approximately 950 to 1,100 ft AMSL. The surface water runoff from the Site drains to wetland areas that border the Site on the northeast and west.

The regional geology consists of approximately 250 to 300 feet of glacial drift underlain by bedrock from the Mississippian-aged Coldwater Shale and Marshall Formation (sandstone unit).

The glacial drift is composed of complex stratifications of clay tills, outwash deposits (sand and gravel), and ice contact deposits (silts and silty clays). Lacustrine deposits (silt and clay) are also common in the topographically lower lying flat areas and are gradational and interbedded with glacial outwash deposits.

The shallow Site geology consists of complex interbedded glacial deposits (silt to gravelly sands) underlain by clay till that appears to be laterally continuous across the Site and surrounding area. This till layer is considered the base of the aquifer of interest at the Site. In the northeastern and western portions of the Site (the topographically lower areas comprised of wetlands) these water bearing silts and sands are overlain by interbedded lacustrine clays. These interbedded lacustrine clays produce semi-confining conditions for the aquifer causing wells in the lower elevation portions of the Site (areas below approximately 990 ft. AMSL) to flow under natural artesian pressure.

The Site is within an area of complex hydrogeology. The soil below the Site is composed of interbedded clay, silt, sand and gravel. The percentage of each material composing the aquifer affects the direction and velocity of groundwater flow, resulting in changes in the direction and nature of the dissolved contaminant plume. Groundwater flow is generally from south to north across the southern two thirds of the Site, toward well DNR-7 (Figure 2). This portion of the Site, located on a topographic high, acts as a local groundwater recharge area. North of well DNR-7, on the northern third of the property, there is a marked decrease in ground surface and aquifer elevation. Just north of this area the aquifer becomes artesian due to the presence of the interbedded lacustrine clays and a corresponding drop in topography. The aquifer pinches and thins out toward the north, which corresponds to a change in groundwater flow direction to the east-northeast towards the wetlands that are present on the northeastern portion of the Site.

### **1.3 STATUS OF GROUNDWATER INVESTIGATIONS**

A dissolved VOC plume has been detected in the water bearing zone beneath the Site. Trichloroethene (TCE) and its degradation products, cis-1,2-dichloroethene (cis-1,2-DCE) and vinyl chloride (VC), are the most prevalent VOCs in groundwater under the Site. TCE is encountered mainly in wells on the south end of the Site near the existing building. VC has been observed in wells near the area of the on-Site building extending to, and possibly beyond,

the northeast property boundary. To monitor the groundwater plume at the Site, 31 monitoring wells are sampled quarterly with an additional 20 wells sampled on an annual basis.

The potential for off-Site groundwater contamination was considered based on the observed VC concentrations in groundwater at the Site property boundary, and the detection of low concentrations of VC in a residential supply well at 510 Demode Road. The residents of this home are provided with bottled water for drinking, and the well is sampled on a monthly basis. Vinyl chloride concentrations in samples from this well have ranged from 0.4 µg/L to 3.5 µg/L since 2003, with the most recent sample (May 2006) containing VC at 2.9 ug/L.

To investigate whether this VC originates at the Site, eight monitoring wells, including GW-22S, GW-22I, GW-22D, GW-23S, GW-23I, GW-23D, GW-24I, and GW-24D were installed off-Site on the opposite side of the wetlands east of the Site (Figure 1). These off-Site wells are sampled quarterly and to date have shown no detectable levels of dissolved VOCs.

To fill possible data gaps and further refine the understanding of the Site hydrogeology and VOC contaminant migration mechanisms, four additional off-Site monitoring wells, MW-25I, MW-25D, MW-26I and MW-26D were installed in April 2006 (Figure 1). Analytical results for samples collected from these wells in April 2006 did not contain detectable concentrations of VC or other VOCs, with the exception of well MW-26D. The sample from well MW-26D contained a low concentration of toluene [1.6 micrograms per liter (µg/L)].

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## **2.0 FIELD AND ANALYTICAL METHODS**

Groundwater gauging and sampling activities were performed at the Site between April 17 and 28, 2006. With the exception of the natural flowing artesian wells, the groundwater monitoring wells were purged and sampled using low-flow pumping methods. The artesian wells were purged using the natural flow-pressures at the wellhead. The field practices and procedures used for the groundwater monitoring wells during the April 2006 groundwater monitoring event were consistent with those established during previous quarterly monitoring events. Fourteen of the thirty-five wells sampled this quarter were purged using a peristaltic pump and dedicated tubing. Four of the thirty-five wells were sampled using a bladder pump and dedicated tubing, and seventeen wells were purged using natural artesian flow. A brief description of the groundwater gauging, sampling, and analyses are provided below.

### **2.1 GROUNDWATER ELEVATIONS**

On April 21, 2006, Earth Tech collected static groundwater level measurements from 101 monitoring wells, 4 pumping wells, 8 piezometers, and 9 staff gauges located both on-Site and off-Site (Table 1 and Figure 3). The groundwater levels from the flowing artesian wells were measured using a sealed k-packer wellhead assembly with a pressure transducer capable of reading water levels to an accuracy of 0.01 feet. Prior to gauging the wells, the transducer was calibrated and any difference in vertical distance from the calibration point to the water surface was noted and recorded so that the readings could be corrected later if necessary. The device was set on top of each well casing and the pressure head was allowed to stabilize before it was recorded in units of feet of water above the top of the well casing (ATOC). The water levels from the stainless steel monitoring wells (GW-1S, GW-2, GW-3S, GW-4S, and GW-6S) were not measured as the larger inside diameter of the casing prevented the k-packer assembly from creating a water tight seal, thus allowing leakage around the k-packer device and preventing an accurate water level reading.

The groundwater levels from the non-flowing wells were measured to within 0.01 feet, using an electronic water level indicator. The distance from the top of the well casing (TOC) to the groundwater potentiometric surface in the well was measured and recorded as the static water

level (SWL). The groundwater level elevations were calculated by subtracting the SWL from the TOC elevation. The water level indicator was decontaminated prior to each use. The active extraction wells, PW-1, PW-3, PW-7, and PW-8, were not gauged as the water levels in these wells are not representative of static groundwater elevations. Groundwater levels from inactive extraction well PW-5 and active extraction wells, PW-4 and PW-6, were also not measured as these wells are under uncontrollable artesian conditions.

## **2.2 GROUNDWATER SAMPLING PROCEDURES**

Groundwater sampling was conducted between April 17 and 28, 2006. Details summarizing the sampling procedures for the low-flow pumping method and natural artesian flow methods are provided in the following sections.

### **2.2.1 LOW-FLOW SAMPLING METHODS**

A total of 22 groundwater monitoring wells were purged using low-flow methods, utilizing either a peristaltic pump (18 wells) or a bladder pump (4 wells), at flow rates ranging from 100 to 500 milliliters per minute<sup>1</sup>. During the installation of the tubing for the peristaltic pump or the placement of the bladder pump, care was taken to minimize disturbance of the stagnant water column in the well. If a bladder pump was used to purge the well, the pump was installed in the well and left in place for at least one hour to equilibrate with the water column before purging commenced.

Field parameters, including pH, temperature, conductivity, dissolved oxygen, oxidation reduction potential (ORP), salinity, and turbidity, were collected and recorded throughout purging activities. With the exception of turbidity, field parameter readings were measured in-line using a sealed flow-through cell and multi-parameter analyzer. Turbidity readings were obtained

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<sup>1</sup> Three of the 18 wells purged by peristaltic pump (DNR-6, RW-1D, and GW-26D) were selected for sampling with both the peristaltic and bladder pump to evaluate the potential for the peristaltic pump to cause a loss of volatile organic compounds during purging. The analytical results of this field test are provided in Section 2.2.3.

using an extracted water sample and a separate optical turbidity meter. Groundwater purging continued until the pH, temperature, and conductivity parameters were observed within  $\pm 10$  percent of the average of three measurements taken five minutes apart. Once the groundwater quality parameters stabilized, the tubing was removed from the flow-through cell and the sample collected directly from the discharge line of the peristaltic or bladder pump. The discharge flow rate was decreased, as necessary, to maintain laminar flow while filling the sample bottles. All purge water was disposed through the on-Site groundwater remediation treatment system.

### **2.2.2 NATURAL ARTESIAN FLOW SAMPLING METHODS**

A total of 11 monitoring wells were purged using natural artesian flow. The flowing artesian wells were sampled using a sealed k-packer wellhead assembly with a small diameter hose barb at the other end. A short section of hose attached this assembly to a flow diversion valve which controlled the amount of water flowing into the flow-through cell. The water flow into the cell was only reduced far enough not to damage the flow through cell. Field parameters were collected and recorded throughout purging activities, as described above for the low-flow method. All purge water was disposed through the on-Site groundwater remediation treatment system.

### **2.2.3 ACTIVE GROUNDWATER EXTRACTION WELL SAMPLING METHODS**

Two active groundwater extraction wells were sampled during the April 2006 sampling event. These wells were sampled using sample collection ports connected to the groundwater treatment system for each well. Field parameters, including pH, temperature, conductivity, dissolved oxygen, ORP, salinity, and turbidity, were collected and recorded prior to the collection of the analytical sample.

### **2.2.4 BLADDER PUMP VS. PERISTALTIC PUMP SAMPLING**

During the April 2006 groundwater sampling event, Earth Tech selected three monitoring wells to collect split samples – one using a peristaltic pump and another using a bladder pump - to determine whether VOC concentrations in samples would vary due to the different purging methods. Earth Tech provided a data table summarizing the analytical results obtained from these three wells to the United States Environmental Protection Agency (EPA) and MDEQ on



May 19, 2006, via electronic transmittal. After reviewing and discussing these data during a teleconference on May 22, 2006, MDEQ approved continued use of peristaltic pumps for low flow sampling at the Site. The analytical results from this split-sampling purging method test are shown on the analytical data tables provided in this report.

### **2.3 ANALYTICAL METHODS**

Groundwater samples were collected at thirty-five monitoring well locations, including DNR-1, DNR-4D, DNR-6, DNR-7, GW-4D, GW-5I, GW-6D, GW-17I, GW-17D, GW-18, GW-19S, GW-19D, GW-20D, GW-20I, GW-21S, GW-21D, GW-22S, GW-22I, GW-22D, GW-23S, GW-23I, GW-23D, GW-24I, GW-24D, GW-25I, GW-25D, GW-26I, GW-26D, MW-3I, MW-102D, MW-103S, PW-7, PW-8, RW-1D, and RW-5S. All well samples were analyzed for the following parameters by Trimatrix Laboratories, of Grand Rapids, Michigan:

- Volatile Organic Compounds (VOCs) by EPA Test Method 8260B
- Biogeochemical Parameters:
  - Dissolved gases (methane, ethane, ethene) by RSK 175
  - Inorganics (ammonia, nitrate/nitrite, sulfate, chloride) by EPA 300 Series Methods
  - Total organic carbon (TOC), and alkalinity (total) by EPA Series 300 and 400 Methods

In addition to the laboratory analytical methods listed above, groundwater from each well was measured in the field for sulfide and dissolved metals (iron and manganese). These field measurements were obtained using colorimetric methods with a Hach DR 850 instrument, after the well was purged and the field parameters had stabilized.

### **2.4 QUALITY ASSURANCE/QUALITY CONTROL SAMPLES**

Quality assurance quality control (QA/QC) samples were collected to monitor the effectiveness of the decontamination procedures and to identify any field or laboratory conditions that may affect sample integrity. QA/QC samples included the following:

- **Duplicate Samples** - Duplicate samples were collected from three monitoring wells. The wells selected for duplicate sample collection were GW-19S, GW-25D, and MW-3I. For each sample obtained, a duplicate set of sample containers was filled immediately following collection of the original sample. Each duplicate sample was handled and analyzed in a fashion identical to the monitoring well samples.
- **Rinsate Samples** - Three rinsate (equipment blank) samples were collected following standard decontamination procedures. Equipment blank samples were collected at a frequency of one sample per day when non-dedicated equipment was being used. For each equipment blank sample, deionized water was poured through the decontaminated sampling equipment and collected in a set of sample containers. Each equipment blank sample was handled and analyzed in a fashion identical to the monitoring well samples.
- **Matrix Spike/Matrix Spike Duplicates (MS/MSD)** - MS/MSD samples were collected from two monitoring wells. The wells selected for MS/MSD sample collection included DNR-1 and GW-23S. For each sample, one additional set of sample containers was filled immediately following the collection of the corresponding original sample and submitted for laboratory QA/QC purposes. Each MS/MSD sample was handled and analyzed in a fashion identical to the monitoring well samples.
- **Field Blank Samples** - Three field blank samples were collected during the sampling event. Field blank samples were collected at a frequency of one for every two days of sampling. Field blank samples were collected by filling a set of VOC bottles with laboratory de-ionized water and leaving the caps off the bottle while conducting the sampling at a monitoring well. Field blank samples were collected during the sampling of wells GW-4D, GW-20I, and PW-7.
- **Trip Blank Samples** - One laboratory-prepared trip blank sample was transported with each cooler containing more than one groundwater sample submitted for VOC analysis. The trip blank sample was only analyzed for VOCs.

All QA/QC and monitoring well samples were placed directly into appropriately preserved sample containers, as prepared and provided by the analytical laboratory. All sample bottles were labeled, packed in coolers, and transported to the analytical laboratory under proper chain-of-custody procedures.

### **3.0 GROUNDWATER MONITORING RESULTS**

A total of thirty-five groundwater monitoring wells were purged and sampled during the April 2006 groundwater monitoring event. All samples were analyzed for VOCs and biogeochemical indicator parameters. A total of 16 QA/QC samples including equipment blanks, field blanks, duplicates, MS/MSDs, and trip blanks were also collected.

Vinyl chloride, TCE, and cis-1,2-DCE are the primary VOCs at the Site based on the detected concentrations and frequency of detections in groundwater. The concentrations of these and other VOCs detected during the April 2006 monitoring event are summarized in Table 2. A historical summary of detected VOCs is provided as Table 3.

The April 2006 groundwater monitoring results are summarized and discussed in the following sections.

#### **3.1 GROUNDWATER ELEVATIONS**

Water levels were measured in 101 groundwater monitoring wells, 4, groundwater extraction wells, 8 piezometers, and 9 staff gauges on April 28, 2006. These water level data are summarized in Table 1.

The groundwater level elevations ranged from 1,014.65 feet above mean sea-level (AMSL) at well RW-10, located in the central portion of the property, to 980.21 feet AMSL at monitoring well GW-22S, located off-Site and east of the northeast corner of the Site. The groundwater flow direction on-Site is generally from south to north at a horizontal gradient of approximately 0.002 feet/foot (ft/ft) across the southern and central portions of the property. The groundwater flow direction becomes more northeasterly near the northern property boundary (near wells DNR-6 and GW-10) and a strong easterly component becomes apparent between well cluster MW-102 and well cluster GW-19 (Figure 3). The groundwater gradient increases to approximately 0.006 ft/ft between these two well clusters.

### 3.2 FIELD PARAMETERS

Groundwater field parameters monitored during well purging activities included temperature, pH, conductivity, dissolved oxygen, turbidity, and ORP. When these parameters stabilize, the purge water is then considered to be representative of groundwater conditions within the water-bearing unit. A general discussion and summary of the stabilization parameters recorded during purging is provided below.

- **Temperature:** Groundwater temperatures ranged from 8.91 (RW-1D) to 13.30 (DNR-6) °C.
- **pH:** Groundwater pH ranged from 7.39 (PW-8) to 9.01 (GW-26D).
- **Conductivity:** Groundwater conductivities ranged from 317 (GW-22D) to 646 (RW-5S) micro siemens per centimeter ( $\mu\text{S}/\text{cm}$ ). The conductivity readings recorded for wells PW-8 (0.001  $\mu\text{S}/\text{cm}$ ) and RW-1S (6.4  $\mu\text{S}/\text{cm}$ ) appear anomalous compared to historical data for these wells.
- **Dissolved Oxygen:** Dissolved oxygen values ranged from 0.08 (GW-19D) to 2.19 (PW-7) mg/L.
- **Turbidity:** Groundwater turbidity ranged from less than 1 (multiple wells) to 18 (GW-25I) nephelometric turbidity units (NTUs). The turbidity reading at well DNR-1 (220 NTU) is anomalous due to low batteries on the instrument. The batteries were replaced following purging of the well.
- **ORP:** Groundwater ORP ranged from -117 (GW-26D) to +169 (DNR-6) millivolts (mV).

The field parameters recorded during the April 2006 sampling event are generally consistent with historical observations, with the exceptions noted above. The low dissolved oxygen and ORP values observed in most monitoring wells is indicative of ambient anaerobic conditions.

### 3.3 ANALYTICAL RESULTS

The VOC concentrations detected in April 2006 are summarized in Table 2. A table showing historical VOC concentrations is provided as Table 3.

The VOC analytical results are compared to the TCLs developed in the ROD (EPA, September 30, 1987). These TCLs are further subdivided into Phase I and Phase II TCLs as identified in the *Remedial Design and Remedial Action Work Plan* (Fred C. Hart Associates, Inc., et al, September 18, 1989). The detected VOC concentrations were also compared to the current MDEQ Remediation and Redevelopment Division (MDEQ-RRD) Part 201 Generic Cleanup (Part 201) Residential Drinking Water, Groundwater Surface Water Interface (GSI), Groundwater Contact Criteria and the 2004 Federal Drinking Water Maximum Contaminant Levels (MCLs).

In general, VOCs were detected in seventeen of the thirty-five monitoring wells sampled in April 2006 (Table 2). No VOCs were detected in monitoring wells DNR-1, DNR-4D, GW-4D, GW-19D, GW-20I, GW-21S, GW-21D, GW-22S, GW-22I, GW-22D, GW-23S, GW-23I, GW-24I, GW-24D, GW-25I, GW-25D, GW-26I, and MW-102D. VOCs that were detected, but did not exceed the Part 201 Criteria, MCLs, or the ROD TCLs, include acetone, carbon disulfide, chlorobenzene, chloroform, chloroethane, 1,1-dichloroethane, trans-1,2-dichloroethene, ethylbenzene, toluene, and 1,1,1-trichloroethane. The detected VOCs that exceeded one or more ROD TCL, Part 201, and/or MCL criterion are summarized below.

### **3.3.1 VINYL CHLORIDE**

Vinyl chloride is the most prevalent VOC at the Site, detected in thirteen of the thirty-five monitoring wells sampled during this monitoring event. The detected VC concentrations in groundwater samples ranged from 1.2 µg/L (GW-6D) to 160 µg/L (GW-5I). The dissolved VC plume begins near well PW-3 (located southeast of the groundwater treatment system building) and extends north to northeast to the property boundary near wells GW-19S and GW-20D. The trends in VC concentrations over time vary between different individual monitoring wells. The VC concentrations detected in groundwater across the Site between June 2005 and April 2006 are summarized on the following table. A VC isoconcentration contour map for the April 2006 sampling event is included as Figure 4. A map showing the historical distribution of VC and TCE concentrations across the Site is provided as Figure 5.

ROD TCLs for Vinyl Chloride		2004 Federal Drinking Water MCL for Vinyl Chloride ( $\mu\text{g/L}$ )	Part 201 Criteria for Vinyl Chloride ( $\mu\text{g/L}$ )		
Phase I TCLs	Phase II TCLs		Residential Drinking Water	Groundwater Surface Water	Groundwater Contact Criteria
1	0.003	2	2	15	1,000
Well ID		Monitoring Event	Observed Vinyl Chloride Concentrations ( $\mu\text{g/L}$ )		
DNR-6	June 2005		130		
	September 2005		100		
	December 2005		Frozen		
	April 2006		30		
DNR-7	June 2005		120		
	September 2005		100		
	December 2005		130		
	April 2006		120		
GW-5I	June 2005		220		
	September 2005		180		
	December 2005		200		
	April 2006		160		
GW-6D	June 2005		4.6		
	September 2005		9.8		
	December 2005		7.2		
	April 2006		1.2		
GW-17I	June 2005		6.5		
	September 2005		24		
	December 2005		Frozen		
	April 2006		19		
GW-17D	June 2005		39		
	September 2005		22		
	December 2005		Frozen		
	April 2006		20		
GW-18	June 2005		26		
	September 2005		43		
	December 2005		Frozen		
	April 2006		38		

ROD TCLs for Vinyl Chloride		2004 Federal Drinking Water MCL for Vinyl Chloride ( $\mu\text{g/L}$ )	Part 201 Criteria for Vinyl Chloride ( $\mu\text{g/L}$ )		
Phase I TCLs	Phase II TCLs		Residential Drinking Water	Groundwater Surface Water	Groundwater Contact Criteria
1	0.003	2	2	15	1,000
Well ID		Monitoring Event	Observed Vinyl Chloride Concentrations ( $\mu\text{g/L}$ )		
GW-19S	June 2005		8.4		
	September 2005		12		
	December 2005		Frozen		
	December 2005		7.5		
GW-20D	June 2005		22		
	September 2005		20		
	December 2005		25		
	April 2006		26		
MW-3I	June 2005		29		
	September 2005		23		
	December 2005		26		
	April 2006		28		
RW-1D	June 2005		ND		
	September 2005		ND		
	December 2005		2.1		
	April 2006		ND		
RW-5S	June 2005		2.3		
	September 2005		5.0		
	December 2005		2.4		
	April 2006		1.7		

The general distribution of VC across the Site is consistent with previous monitoring events. The VC concentrations in groundwater from downgradient wells GW-18 and GW-20D have increased slightly since these wells were first sampled in December 2003 (Table 3 and Figure 5). To date, VC has not been observed in the off-Site well clusters GW-22I/S/D, GW-23I/S/D, and GW-24I/D, located further down gradient. With the exception of low concentrations of carbon disulfide, VOCs have not been detected at these wells.

### 3.3.2 CIS-1,2-DICHLOROETHENE

cis-1,2-Dichloroethene (cis-1,2-DCE) was detected in groundwater samples collected from four of the thirty-five monitoring wells included in the April 2006 sampling event. Cis-1,2-DCE concentrations ranged from 2.5 µg/L at well MW-103S to 230 µg/L at well DNR-7. The wells where cis-1,2-DCE was detected, and the reported concentrations, are provided in the table below. cis-1,2-DCE is typically observed in the north central portion of the site.

2004 Federal Drinking Water MCL for Cis-1,2- DCE  (µg/L)	MDEQ Part 201 Residential Drinking Water Criteria for Cis-1,2- DCE  (µg/L)	Cis-1,2-DCE  Analytical Results (µg/L)  April 2006			
		DNR-7	MW-103S	PW-7	RW-1D
70	70	230	2.5	56	12

Notes:

MCL = Maximum Contaminant Level

Shaded areas indicate that the concentration exceeds the MCL Part 201 Criteria. No ROD TCLs were established for cis-1,2-DCE.

Over the last four sampling events, the cis-1,2-DCE concentrations have remained generally stable across the Site.

### 3.3.3 TRICHLOROETHENE

TCE was detected in groundwater samples collected from two of the thirty-five monitoring wells sampled in April 2006. The detected concentrations were 61 µg/L at well RW-1D and 3.0 µg/L at well PW-8. The wells where TCE was detected, and the reported concentrations, are provided in the table below. TCE and VC isoconcentration contours are shown in Figure 4.



ROD TCLs for TCE		2004 Federal Drinking Water MCL for TCE ( $\mu\text{g/L}$ )	Part 201 Residential Drinking Water Criteria for TCE ( $\mu\text{g/L}$ )	TCE Analytical Results ( $\mu\text{g/L}$ )  April 2006	
Phase I TCLs ( $\mu\text{g/L}$ )	Phase II TCLs ( $\mu\text{g/L}$ )			RW-1D	PW-8
1.5	0.627	5	5	140	3.0

Notes:

MCL = Maximum Contaminant Level

Shaded areas indicate that the concentration exceeds the ROD, MCL, or Part 201 Criteria.

The TCE concentrations reported in April 2006 are generally consistent with those observed in recent sampling events, with the exception that TCE was detected in well PW-8. During previous sampling events RW-1D has shown TCE concentration that varies around the method detection limit. The sample collected from RW-1D in April 2006 did not contain a detectable concentration of TCE. A map showing the historical distribution of TCE and VC concentrations across the Site is provided as Figure 5.

#### 3.3.4 BENZENE

Benzene was detected in the groundwater sample collected from one of the thirty-five monitoring wells sampled - PW-7 at a concentration of 7.3  $\mu\text{g/L}$ . Benzene is sporadically observed in the central portion of the site.

The occurrence of benzene is generally consistent previous sampling events. A map showing the historical distribution of benzene concentrations across the Site is provided as Figure 5.

### **3.3.5 BIOGEOCHEMICAL DATA**

All groundwater samples collected in April 2006 were analyzed for biodegradation indicators including methane, ethane, ethene, nitrate/nitrite, ammonia, chloride, sulfate, total alkalinity, and total organic carbon. Pumping well PW-8 was inadvertently not sampled for biogeochemical analysis. Additional biogeochemical parameters were collected in the field from all thirty-five wells, including dissolved oxygen, ORP, dissolved iron, dissolved manganese, and sulfide. These parameters are used to determine the aerobic/anaerobic condition of the aquifer. In general, electron acceptors progress from oxygen to nitrate, manganese, iron, sulfate and methane, with oxygen indicating the aerobic end of the scale and methane indicating the anaerobic end of the scale.

A summary of the April 2006 biogeochemical results is provided in Table 4. The dissolved metals analytical results are also provided in Table 4. A summary of the biogeochemical and metals results obtained during this sampling event is provided as follows:

#### **Field Measurements**

**Dissolved Oxygen:** Dissolved oxygen values ranged from 0.08 (GW-19D) to 2.19 (PW-7) mg/L (see Section 3.2).

**ORP:** ORP readings ranged from -117 (GW-26D) to +169 (DNR-6) millivolts (mV) (see Section 3.2).

**Sulfide:** Sulfide concentrations ranged from 0.00 mg/L (multiple wells) to 0.68 mg/L (DNR-1).

**Dissolved Iron:** Dissolved iron concentrations ranged from 0.24 mg/L (multiple wells) to 3.26 mg/L (DNR-1).

**Dissolved Manganese:** Dissolved manganese concentration ranged from 0.00 mg/L (GW-19S) to 3.70 mg/L (DNR-1).

#### **Laboratory Results**

**Methane:** Methane was detected in thirty-two of thirty-five wells sampled, at concentrations ranging from 1.5 µg/L (GW-26I) to 180 µg/L (multiple wells).

**Ethane:** Ethane was detected in one of the thirty-five wells sampled. Ethane was detected in GW-26D at a concentration of 9.3µg/L.

**Ethene:** Ethene was detected in four of the thirty-five wells sampled at concentrations ranging from 1.6 µg/L (GW-19S) to 14 µg/L (PW-7).

**Nitrate/Nitrite:** Nitrite was not detected in any of the wells sampled. Nitrate was detected in GW-22D at a concentration of 0.093 mg/L.

**Sulfate:** Sulfate was detected in thirty of the thirty-five wells sampled, at concentrations ranging from 8.6 (PW-7) to 29 mg/L (GW-19S). Sulfate was not detected at wells DNR-1, GW-19D, MW-102D, or RW-1D. Pumping well PW-8 was inadvertently not sampled for biogeochemical analysis.

**Ammonia:** Ammonia was detected in thirty of the thirty-five wells sampled at concentrations ranging from 0.056 mg/L (GW-19S) to 0.28 mg/L (DNR-1). Ammonia was not detected at wells DNR-6, GW-22D, GW-25D, or RW-5S. Pumping well PW-8 was inadvertently not sampled for biogeochemical analysis.

**Chloride:** Chloride concentrations ranged from 1.7 mg/L (multiple wells) to 17 mg/L (GW-26D).

**Total Alkalinity:** Total alkalinity concentrations ranged from 150 mg/L (GW-22S and GW-22D) to 310 mg/L (multiple wells).

**Total Organic Carbon:** Total organic carbon content ranged from below the reporting limit of 1.1 mg/L (GW-21D and GW-22S) to 14 mg/L (DNR-6).

Based on a review of these data, the aquifer appears to be under predominantly anaerobic conditions, although neither strongly anaerobic nor aerobic conditions are apparent. Weakly aerobic conditions, as indicated by the elevated DO and ORP levels are present in GW-22D. Elevated concentrations of methane in DNR-7, GW-5I, and MW-102D suggest that methanogenesis (anaerobic degradation) may be occurring at these locations. The overall low values for ORP are more indicative of anaerobic conditions.

### **3.4 QA/QC RESULTS**

Analytical results for the QA/QC samples collected during the April 2006 sampling event are summarized below.

#### **Trip Blanks**

Seven trip blank samples were submitted to the lab for analysis of VOCs. All seven samples contained no detectable concentration of any VOC. None of the seven trip blank samples had elevated reporting limits (RLs).

#### **Field Blanks**

Three field blank samples were submitted to the laboratory for analysis of VOCs. All three samples contained no detectable concentration of any VOC. None of the three field blank samples had elevated reporting limits (RLs).

#### **Equipment Blanks**

Three equipment blank samples were submitted to the laboratory for analysis of VOCs. All three samples contained non-detectable concentrations of all VOCs. None of the three equipment blank samples had elevated reporting limits (RLs).

#### **Duplicate Samples**

Duplicate samples [GW19S/GW19R, GW25D/GW25R, and MW3I/MW3R] were reviewed for field precision within 50% relative percent difference (RPD).

#### **Laboratory Method Blanks**

All laboratory method blanks were non-detect for all VOCs. No samples were qualified because of method blanks.

#### **Laboratory Control Samples**

The laboratory control sample (LCS) for batches 6042120, 6042841, 6042849, and 6050138 was outside of the laboratory control limits for total organic carbon. The LCS for batch 6042140 was outside of the laboratory control limits for ammonia. The CRL for batch 6042440 was

outside of the laboratory control limits for chloride. However, no data was qualified as a result of the LCS samples.

#### **MS/MSDs**

In instances where the matrix spike/matrix spike duplicate (MS/MSD) recoveries were outside of control limits, the relative percent difference (RPD) between them was within the control limits. No groundwater data were qualified as a result of laboratory MS/MSD samples.

#### **Holding Times**

All groundwater samples were analyzed within the recommended holding times for each analysis.

#### **4.0 SUMMARY**

Water levels were collected from a total of 101 groundwater monitoring wells, 4, groundwater extraction wells, 8 piezometers, and 9 staff gauges on April 28, 2006. Purging and sampling activities were performed on 23 on-site and 12 off-site wells between April 17 and 26, 2006 following appropriate technical and quality control procedures. All groundwater samples were submitted to Trimatrix Laboratories for analysis. All samples were analyzed within recommended holding times following strict quality control procedures.

In April 2006, groundwater elevations increased an average of 1.1 feet since the last monitoring event in December 2005. The groundwater flow direction on-Site is generally from south to north in the southern and central portions of the property. The groundwater flow direction becomes more northeasterly near the northern property boundary (near wells DNR-6 and GW-10) and a strong easterly component becomes apparent between well cluster MW-102 and well cluster GW-19 (Figure 3). The groundwater gradient increases to approximately 0.006 ft/ft between these two well clusters. Groundwater flow may extend eastward from the area near GW-19 toward off-Site wells near Demode Road, however, no VOCs have been detected in any groundwater monitoring wells on that side of the wetland.

The distribution of dissolved VOCs in the aquifer is generally consistent with historical patterns, with the exceptions noted below. TCE was not detected in RW-1D. During previous sampling events RW-1D has shown TCE concentration that varies around the method detection limit. TCE was detected in PW-8. Historically PW-8 has not had detectable levels of TCE.

No VOCs have been detected in any off-Site monitoring wells, despite the low level occurrence of VC in off-Site private supply wells.

## **5.0 PLANNED PROJECT ACTIVITIES**

The next two groundwater sampling events for Year 2006 are planned to take place in June and September 2006, respectively.

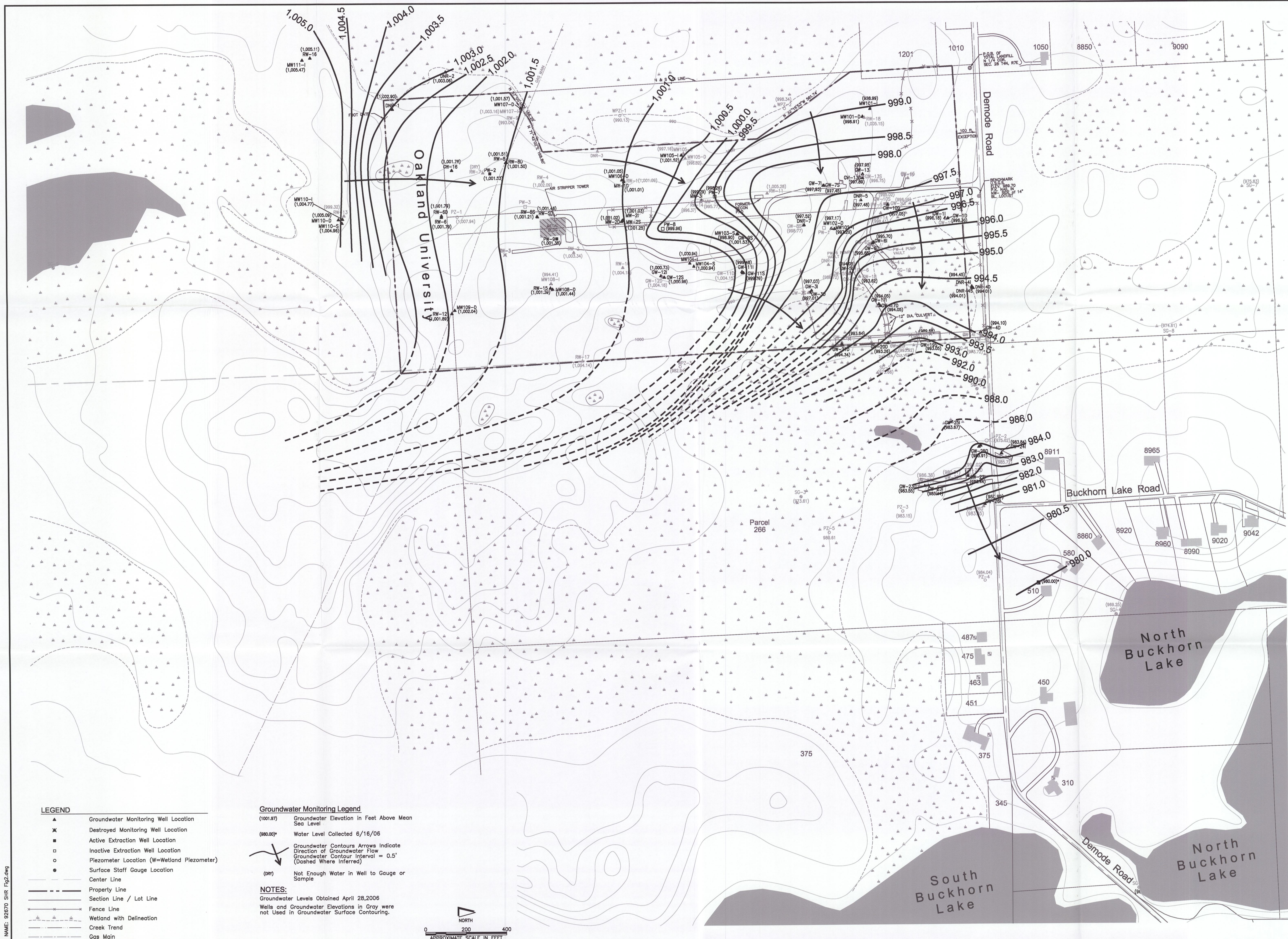






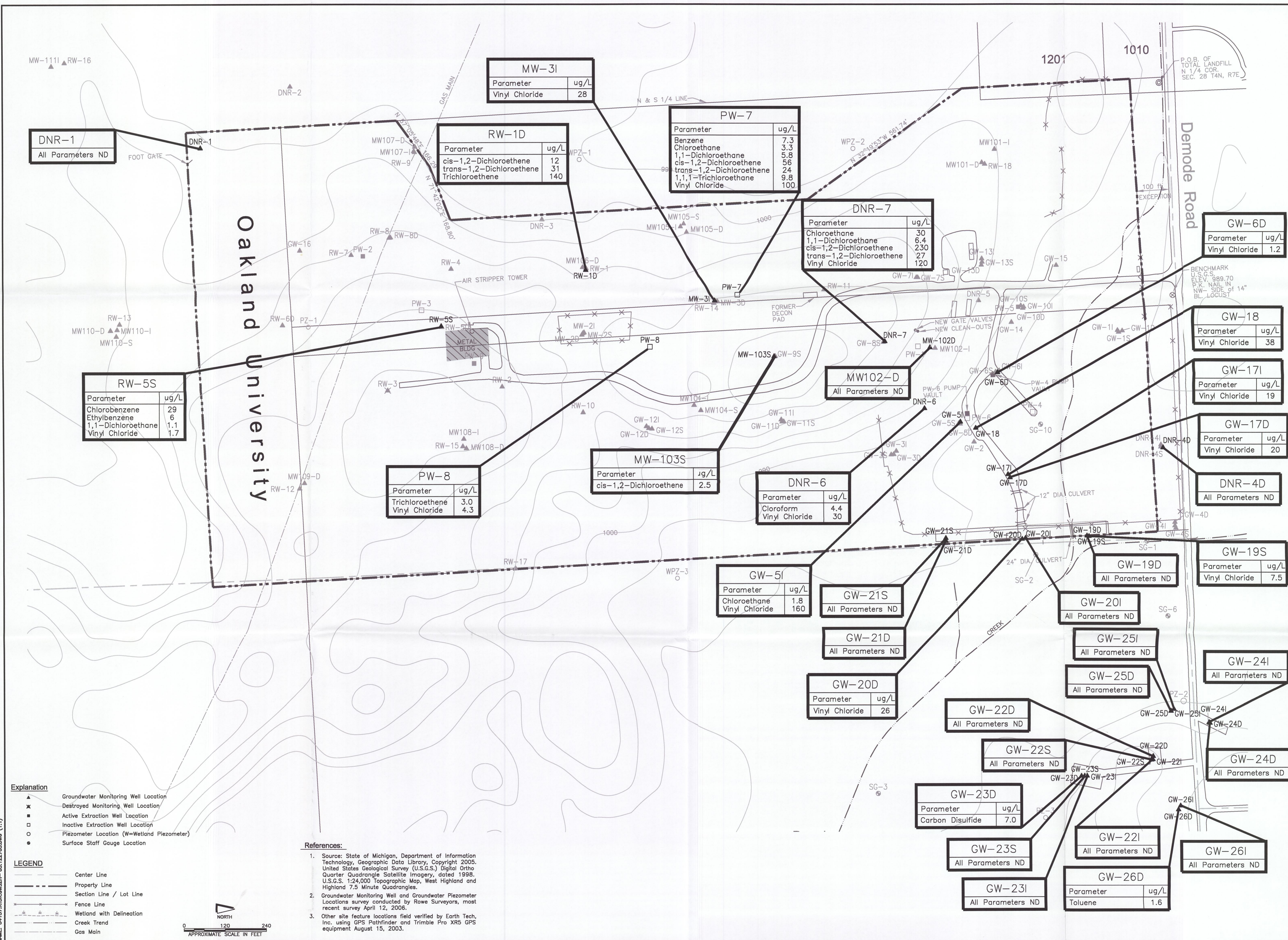


FILE NAME: 92870 SHR Fig2.dwg



Rose Township Demode Road Holly, Michigan		Figure 2 Groundwater Level Elevation Contour Map APRIL 2006		 <b>EarthTech</b> A Tyco International Ltd. Company		LIVONIA, MICHIGAN				NO	REVISIONS	DRN	CHK	DATE
						DRN	DES	CHK	APP					
DATE		6/22/06		89861		Copyright © Earth Tech, Inc., All Rights Reserved								
PROJECT NO				89861										
FILENAME				89861Q12006Fig2.dwg										
SHEET NO				2 of 5										
DRAWING NO														
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Rose Township Demode Road Holly, Michigan		 <b>EarthTech</b> A Tyco International Ltd. Company		LIVONIA, MICHIGAN																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
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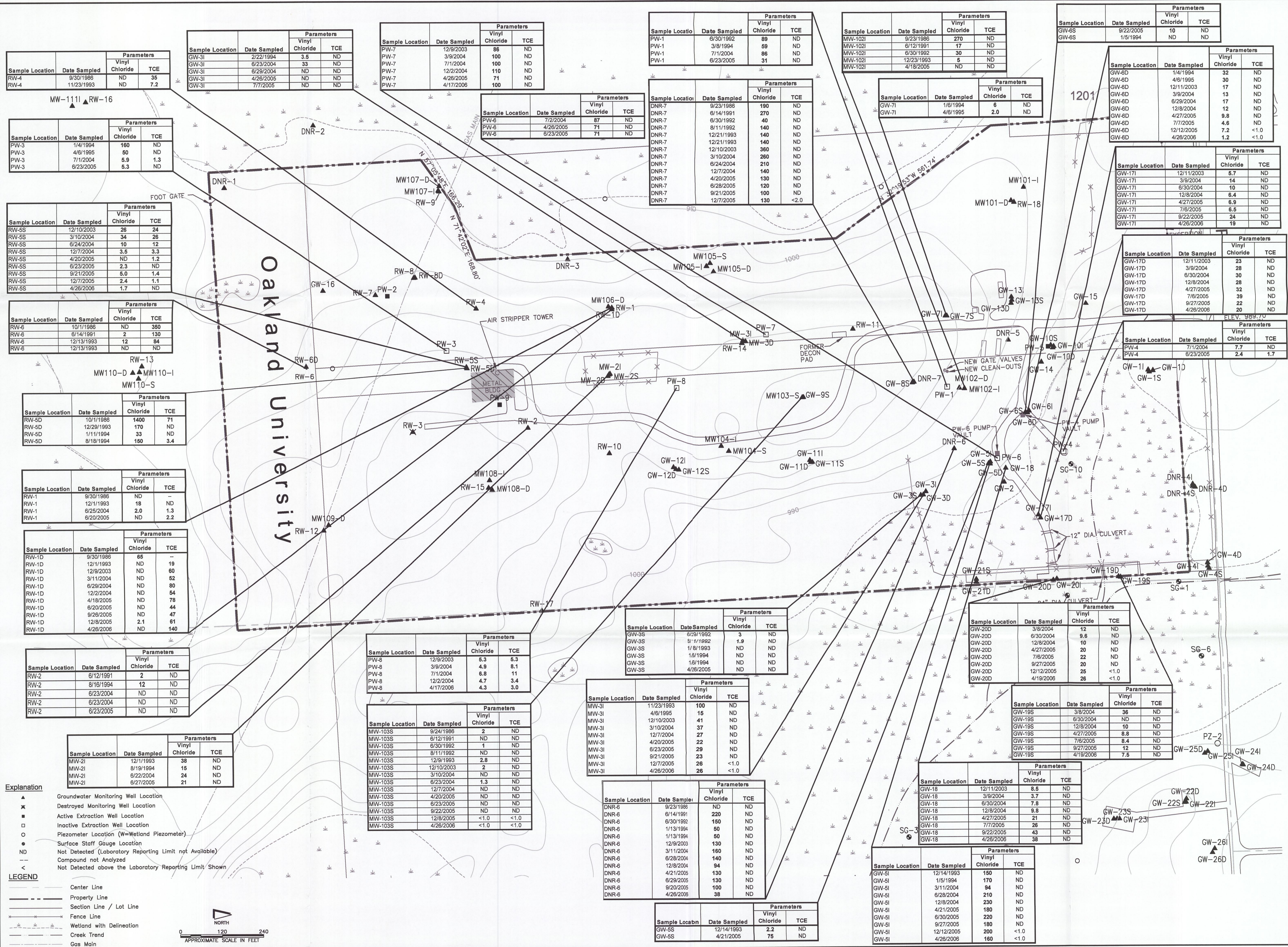
Explanation

- ▲ Groundwater Monitoring Well Location
- Destroyed Monitoring Well Location
- Active Extraction Well Location
- Inactive Extraction Well Location
- Piezometer Location (W=Wetland Piezometer)
- Surface Staff Gauge Location
- ND Not Detected (Laboratory Reporting Limit not Available)
- Compound not Analyzed
- < Not Detected above the Laboratory Reporting Limit Shown

LEGEND

- Center Line
- Property Line
- Section Line / Lot Line
- Fence Line
- Wetland with Delineation
- Creek Trend
- Gas Main

0 120 240  
APPROXIMATE SCALE IN FEET



Rose Township Demode Road  
Holly, Michigan

Figure 5  
Summary of Historical TCE and  
Vinyl Chloride Concentrations

DATE 3/06  
PROJECT NO 89861  
FILENAME 89861VOCFig 5a.dwg  
SHEET NO 5 of 5  
DRAWING NO 5

EarthTech  
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LIVONIA, MICHIGAN

DRN DES CHK APP

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NO

REVISIONS

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DATE





**Table 1**  
**Summary of Water Level Elevations April 2006**  
**Rose Township Demode Road Site**  
**Holly, Michigan**

Well ID	Northing	Easting	Top of Casing Elevation (ft. AMSL)	Ground Surface Elevation (ft. AMSL)	Screen Length (feet)	Screened Interval		Total Depth (ft. AMSL)	Flowing Well	April-06	
						Screen Minimum Depth (ft. AMSL)	Screen Maximum Depth (ft. AMSL)			Water Level Measurement (ft. ATOC)	Head Elevation (ft. AMSL)
DNR-1	444677.19	13319929.47	1000.65	1004.00	2.0	953.0	951.0	951.0	Yes	2.25	1002.90
DNR-2	444939.57	13319748.06	997.33	1000.60	2.0	907.6	905.6	905.6	Yes	5.73	1003.06
DNR-3	445688.24	13320139.49	996.92	1002.40	2.0	920.4	918.4	918.4	Yes	NM	
DNR-4S	447532.39	13320808.49	981.20	978.70	5.0	930.7	925.7	925.7	Yes	12.81	994.01
DNR-4I	447532.60	13320802.39	981.33	979.33	5.0	900.3	895.3	895.3	Yes	13.12	994.45
DNR-4D	447539.01	13320810.89	978.50	979.10	2.0	863.1	861.1	861.1	Yes	15.51	994.01
DNR-5	446988.03	13320380.71	998.14	1001.70	2.0	904.7	902.7	902.7	Yes	-0.66	997.48
DNR-6	446826.83	13320695.53	996.58	992.56	2.0	924.6	922.6	922.6	Yes	NM@	
DNR-7	446708.57	13320500.96	1031.85	1032.20	2.0	953.2	951.2	951.2	No	-34.33	997.52
GW-1S	447405.64	13320473.72	980.33	977.70	NA	NA	NA	NA	Yes	NA †	
GW-1I	447402.39	13320468.56	979.91	976.91	5.0	885.9	880.9	880.9	Yes	16.27	996.18
GW-1D	447416.34	13320470.01	980.48	977.73	5.0	855.7	850.7	850.7	Yes	15.88	996.36
GW-2	446973.75	13320794.04	981.34	978.34	5.0	937.8	932.8	932.8	Yes	NA #	
GW-3S	446734.78	13320830.55	990.87	987.87	5.0	925.9	920.9	920.9	Yes	NA †	
GW-3I	446734.78	13320830.55	991.13	988.63	5.0	909.1	904.1	904.1	Yes	5.90	997.03
GW-3D	446734.78	13320830.55	990.60	988.60	5.0	890.6	885.6	885.6	Yes	6.41	997.01
GW-4S	447577.63	13321047.35	978.23	975.56	5.0	917.6	912.6	912.6	Yes	NA †	
GW-4I	447574.64	13321040.42	977.35	974.60	5.0	889.6	884.6	884.6	Yes	NM	
GW-4D	447574.24	13321030.39	977.27	974.60	5.0	865.6	860.6	860.6	Yes	16.83	994.10
GW-5S	446928.46	13320739.18	983.89	982.39	5.0	930.4	925.4	925.4	Yes	2.83	986.72
GW-5I	446933.48	13320734.62	984.53	982.57	5.0	912.6	907.6	907.6	Yes	9.52	994.05
GW-5D	446932.99	13320740.73	984.66	982.28	5.0	891.8	886.8	886.8	Yes	NM	
GW-6S	447038.22	13320589.52	982.42	981.00	5.0	927.0	922.0	922.0	Yes	NA #	
GW-6I	447048.80	13320585.72	982.43	979.89	5.0	906.9	901.9	901.9	Yes	13.27	995.70
GW-6D	447043.97	13320590.86	982.09	979.84	5.0	887.8	882.8	882.8	Yes	13.59	995.68
GW-7S	446806.97	13320309.59	1025.20	1022.32	5.0	998.3	993.3	993.3	No	-27.75	997.45
GW-7I	446802.93	13320309.59	1025.24	1022.95	5.0	953.5	948.5	948.5	No	-27.31	997.93
GW-8S	446703.98	13320502.98	1031.99	1029.66	5.0	993.7	988.7	988.7	No	-33.22	998.77
GW-9S	446379.76	13320544.39	1038.33	1035.91	5.0	1000.4	995.4	995.4	No	-36.80	1001.53
GW-10S	447114.18	13320396.37	989.70	987.24	5.0	912.2	907.2	907.2	Yes	5.32	995.02
GW-10I	447122.52	13320399.72	989.58	986.87	5.0	888.9	883.9	883.9	Yes	7.01	996.59
GW-10D	447119.94	13320403.80	989.50	986.67	5.0	866.7	861.7	861.7	Yes	7.55	997.05
GW-11S	446409.53	13320733.82	1030.19	1027.69	5.0	981.2	976.2	976.2	No	-30.80	999.39
GW-11I	446402.35	13320728.06	1030.29	1027.83	5.0	892.8	887.8	887.8	No	-30.81	999.48
GW-11D	446404.83	13320734.18	1030.05	1027.51	5.0	844.5	839.5	839.5	No	-25.90	1004.15
GW-12S	446013.89	13320755.24	1031.12	1028.29	5.0	962.8	957.8	957.8	No	-30.16	1000.96
GW-12I	445997.47	13320748.12	1030.52	1027.64	5.0	889.6	884.6	884.6	No	-29.79	1000.73
GW-12D	446004.63	13320753.73	1031.01	1028.13	5.0	837.1	832.1	832.1	No	-26.83	1004.18
GW-13S	446998.74	13320264.22	1009.84	1006.96	5.0	932.0	927.0	927.0	No	-13.09	996.75
GW-13I	446997.63	13320254.84	1010.12	1006.99	5.0	915.0	910.0	905.0	No	-12.17	997.95
GW-13D	446996.88	13320273.21	1009.60	1006.72	5.0	886.7	881.7	866.7	No	-11.71	997.89
GW-14	447085.90	13320445.08	990.08	986.87	5.0	810.9	805.9	746.9	Yes	8.33	998.41
GW-15	447219.87	13320274.36	985.85	983.31	5.0	885.3	880.3	880.3	Yes	NM	
GW-16	444967.05	13320229.71	1016.58	1013.75	5.0	969.3	964.3	964.3	No	-14.82	1001.76
GW-17I	447074.82	13320890.41	981.06	977.90	5.0	886.9	881.9	881.9	Yes	12.93	993.99
GW-17D	447081.12	13320899.45	981.31	978.20	5.0	868.2	863.2	863.2	Yes	12.74	994.05
GW-18	446978.96	13320752.94	983.81	980.80	5.0	889.3	884.3	884.3	Yes	9.81	993.62
GW-19S	447318.57	13321071.94	976.34	973.60	5.0	893.6	888.6	888.6	Yes	16.71	993.05
GW-19D	447312.59	13321070.45	977.28	973.50	5.0	860.5	855.5	855.5	Yes	12.40	989.68
GW-20I	447127.35	13321077.00	979.83	976.40	5.0	891.4	886.4	886.4	Yes	14.09	993.92
GW-20D	446889.51	13321077.25	979.76	976.30	5.0	859.3	854.3	854.3	Yes	13.50	993.26
GW-21S	446889.33	13321084.88	981.02	978.40	5.0	918.4	913.4	913.4	Yes	12.62	993.64
GW-21D	446889.51	13321089.69	980.87	978.30	5.0	871.3	866.3	866.3	Yes	13.47	994.34

**Table 1**  
**Summary of Water Level Elevations April 2006**  
**Rose Township Demode Road Site**  
**Holly, Michigan**

Well ID	Northing	Easting	Top of Casing Elevation (ft. AMSL)	Ground Surface Elevation (ft. AMSL)	Screen Length (feet)	Screened Interval Screen Minimum Depth (ft. AMSL)	Screen Maximum Depth (ft. AMSL)	Total Depth (ft. AMSL)	Flowing Well	Water Level Measurement (ft. ATOC)	April-06 Head Elevation (ft. AMSL)
GW-22S	447503.60	13321729.90	1005.24	1002.10	5.0	950.1	945.1	945.1	No	-25.03	980.21
GW-22I	447507.94	13321728.93	1005.06	1002.10	5.0	916.1	911.1	911.1	No	-21.62	983.44
GW-22D	447509.01	13321719.40	1004.34	1001.40	5.0	838.4	833.4	833.4	No	-13.32	991.02
GW-23S	447304.09	13321777.45	992.33	989.40	5.0	948.4	943.4	943.4	No	-8.95	983.38
GW-23I	447311.30	13321776.99	993.15	990.00	5.0	895.0	890.0	890.0	No	-9.74	983.41
GW-23D	447294.60	13321777.67	991.92	988.90	5.0	863.9	858.9	858.9	No	-8.37	983.55
GW-24I	447672.77	13321619.46	988.51	985.60	5.0	864.6	859.6	859.6	No	-4.67	983.84
GW-24D	447675.24	13321620.87	988.78	985.90	5.0	845.9	840.9	840.9	No	-3.06	985.72
GW-25I	447571.27	13321581.05	986.45	983.79	5.0	909.8	904.8	904.8	No	-2.78	983.67
GW-25D	447562.48	13321586.79	986.52	983.99	5.0	863.0	858.0	858.0	No	-2.61	983.91
GW-26I	447590.03	13321866.04	997.40	994.56	5.0	927.6	922.6	922.6	No	-16.41	980.99
GW-26D	447584.49	13321877.05	996.62	993.78	5.0	867.8	862.8	862.8	No	-13.27	983.35
MW-2S	445808.74	13320476.97	1023.59	1021.55	5.0	1002.6	997.6	997.6	No	-22.34	1001.25
MW-2I	445812.02	13320474.87	1024.17	1021.42	5.0	963.4	958.4	958.4	No	-23.14	1001.03
MW-2D	445805.70	13320481.32	1024.01	1021.47	5.0	924.5	919.5	919.5	No	-22.99	1001.02
MW-3I	446205.86	13320379.77	1029.94	1027.56	5.0	952.6	947.6	947.6	No	-30.66	999.28
MW-3D	446213.49	13320381.94	1030.06	1027.96	5.0	904.0	899.0	899.0	No	-34.29	995.77
MW101-I	447035.94	13319934.32	1003.03	1000.72	2.0	940.7	938.7	938.7	No	-4.04	998.99
MW101-D	446998.14	13319973.18	1004.49	1001.35	5.0	914.4	909.4	909.4	No	-5.58	998.91
MW102-I	446857.96	13320520.17	1009.37	1006.70	2.0	928.7	926.7	926.7	No	-12.11	997.26
MW102-D	446842.77	13320518.72	1010.77	1008.48	5.0	897.0	892.0	892.0	No	-13.60	997.17
MW103-S	446383.27	13320544.02	1038.10	1036.18	5.0	943.2	938.2	938.2	No	-39.20	998.90
MW104-S	446164.83	13320701.00	1037.38	1034.42	2.0	997.4	995.4	995.4	No	-36.44	1000.94
MW104-I	446142.88	13320686.20	1037.05	1034.30	8.0	965.3	957.3	957.3	No	-36.06	1000.99
MW105-S	446112.57	13320151.84	1007.08	1003.70	5.0	978.7	973.7	973.7	No	-9.92	997.16
MW105-I	446102.22	13320160.52	1008.95	1006.20	5.0	966.2	961.2	961.2	No	-8.43	1000.52
MW105-D	446121.94	13320176.55	1008.74	1005.99	10.0	916.0	906.0	906.0	No	-9.92	998.82
MW-106D	445808.57	13320279.68	1020.06	1017.39	5.0	927.4	922.4	922.4	No	-19.01	1001.05
MW107-I	445307.04	13319939.26	996.49	995.70	2.0	943.7	941.7	941.7	Yes	6.67	1003.16
MW107-D	445310.25	13319926.43	995.34	993.88	5.0	922.9	917.9	917.9	Yes	6.23	1001.57
MW108-I	445453.13	13320783.82	1052.51	1049.80	5.0	989.8	984.8	984.8	No	-58.10	994.41
MW108-D	445460.68	13320811.77	1051.24	1048.49	2.0	972.5	970.5	970.5	No	-49.80	1001.44
MW109-D	444977.98	13320912.96	1046.69	1044.02	5.0	900.0	895.0	895.0	No	-44.65	1002.04
MW110-S	444435.24	13320447.67	1014.42	1011.00	2.0	964.0	962.0	962.0	No	-9.46	1004.96
MW110-I	444435.24	13320447.67	1013.78	1010.70	2.0	933.7	931.7	931.7	No	-9.01	1004.77
MW110-D	444435.24	13320447.67	1013.46	1010.80	5.0	888.8	883.8	883.8	No	-8.37	1005.09
MW-111I	444233.00	13319687.50	1011.83	1008.70	5.0	938.7	933.7	933.7	No	-6.36	1005.47
PW-1	446807.02	13320515.22	1015.26	1012.80	31.8	964.6	932.8	932.8	No	Not Measured **	
PW-2	445155.78	13320245.80	1025.71	1023.38	35.4	978.8	943.4	943.4	No	-24.18	1001.53
PW-3	445329.15	13320406.91	1036.42	1034.67	31.9	996.6	964.7	964.7	No	Not Measured **	
PW-4	447149.39	13320705.72	978.83	976.00	30.0	884.0	854.0	854.0	Yes	Not Measured **	
PW-5	447106.28	13320399.90	990.10	987.85	32.6	898.4	865.9	865.9	Yes	Not Measured **	
PW-6	446954.18	13320724.28	984.42	981.84	45.0	914.8	869.8	869.8	Yes	Not Measured **	
PW-7	446273.90	13320361.95	1030.96	1027.88	70.0	995.9	925.9	925.9	No	-32.70	998.26
PW-8	446008.82	13320516.99	1038.71	1036.21	76.0	997.2	921.2	921.2	No	-38.75	999.96
PW-9	445484.71	13320563.03	1044.54	1042.00	60.0	1002.0	942.0	942.0	No	-43.16	1001.38
RW-1	445818.72	13320282.99	1019.97	1017.14	3.0	990.1	987.1	987.1	No	-18.88	1001.09
RW-1D	445817.80	13320288.04	1019.60	1017.14	3.0	950.6	947.6	947.6	No	-18.59	1001.01
RW-2	445567.73	13320631.06	1050.02	1046.35	3.0	1001.4	998.4	998.4	No	-46.68	1003.34
RW-3	445227.94	13320641.44	1052.52	1050.17	3.0	996.2	993.2	993.2	No	Destroyed	



**Table 1**  
**Summary of Water Level Elevations April 2006**  
**Rose Township Demode Road Site**  
**Holly, Michigan**

Well ID	Northing	Easting	Top of Casing Elevation (ft. AMSL)	Ground Surface Elevation (ft. AMSL)	Screen Length (feet)	Screened Interval		Total Depth (ft. AMSL)	Flowing Well	April-06	
						Screen Minimum Depth (ft. AMSL)	Screen Maximum Depth (ft. AMSL)			Water Level Measurement (ft ATOC)	Head Elevation (ft AMSL)
RW-4	445417.19	13320284.45	1023.66	1020.87	3.0	991.9	988.9	988.9	No	-22.27	1001.39
RW-5S	445387.36	13320454.65	1039.78	1037.03	3.0	990.0	987.0	987.0	No	-38.57	1001.21
RW-5D	445389.07	13320457.55	1039.37	1036.87	5.0	976.9	971.9	971.9	No	-37.91	1001.46
RW-6	444915.45	13320450.88	1026.42	1023.59	3.0	992.6	989.6	989.6	No	-24.63	1001.79
RW-6D	444915.45	13320450.88	1026.98	1023.48	3.0	957.5	954.5	954.5	No	-25.19	1001.79
RW-7	445120.68	13320242.82	1022.74	1020.11	5.0	1006.6	1001.6	1001.6	No	Dry	
RW-8	445233.79	13320192.70	1023.06	1020.31	3.0	983.3	980.3	980.3	No	-21.55	1001.51
RW-8D	445237.45	13320191.79	1022.20	1020.45	3.0	950.5	947.5	947.5	No	-20.70	1001.50
RW-9	445309.05	13319941.89	999.99	997.07	3.0	986.1	983.1	983.1	No	-6.95	993.04
RW-10	445809.13	13320706.46	1023.13	1019.92	3.0	1004.9	1001.9	1001.9	No	-8.48	1014.65
RW-11	446529.54	13320346.67	1035.04	1032.00	3.0	999.0	996.0	996.0	No	-29.76	1005.28
RW-12	444963.45	13320929.00	1046.84	1044.01	3.0	1000.0	997.0	997.0	No	-44.95	1001.89
RW-13	444435.24	13320447.67	1010.77	1007.77	3.0	996.8	993.8	993.8	No	-11.45	999.32
RW-14	446202.95	13320387.44	1031.74	1028.49	3.0	998.5	995.5	995.5	No	-35.37	996.37
RW-15	445450.12	13320805.75	1051.04	1047.75	2.0	996.8	994.8	994.8	No	-49.65	1001.39
RW-16	444272.30	13319677.20	1011.43	1007.93	3.0	990.4	987.4	987.4	No	-6.32	1005.11
RW-17	445605.90	13321164.30	1016.76	1014.59	3.0	974.6	971.6	971.6	No	-12.62	1004.14
RW-18	447006.83	13319977.71	1010.78	1006.45	3.0	976.0	973.0	973.0	No	-5.63	1005.15
SG-1	447491	13321086	973.06	NA	NA	NA	NA	NA	No	0.66	973.72
SG-2	447158	13321126	972.86	NA	NA	NA	NA	NA	No	0.80	973.66
SG-3	446686	13321828	972.88	NA	NA	NA	NA	NA	No	0.73	973.61
SG-4	448241	13322404	967.79	NA	NA	NA	NA	NA	No	1.46	969.25
SG-5	448342	13323740	967.44	NA	NA	NA	NA	NA	No	2.18	969.62
SG-6	447554	13321305	973.18	NA	NA	NA	NA	NA	No	0.45	973.63
SG-7	448923	13320339	975.17	NA	NA	NA	NA	NA	No	0.66	975.83
SG-8	448508	13321050	973.73	NA	NA	NA	NA	NA	No	0.88	974.61
SG-9	443006	13320693	989.51	NA	NA	NA	NA	NA	No	1.49	991.00
SG-10	447173	13320742	972.83	NA	NA	NA	NA	NA	No	NM	
PZ-1	444993	13320456	1028.44	NA	10.0	NA	NA	NA	No	-20.50	1007.94
PZ-2	447600	13321558	982.74	NA	10.0	NA	NA	NA	No	-7.12	975.62
PZ-3	447185	13321900	992.35	NA	10.0	NA	NA	NA	No	-9.20	983.15
PZ-4	447589	13322238	1010.26	NA	10.0	NA	NA	NA	No	-26.22	984.04
PZ-5	446823	13322002	983.73	NA	10.0	NA	NA	NA	No	-3.12	980.61
WPZ-1	445800	13319964	993.47	NA	5.0	NA	NA	NA	No	-3.34	990.13
WPZ-2	446616	13319932	991.37	NA	5.0	NA	NA	NA	No	-3.03	988.34
WPZ-3	446089	13321194	985.87	NA	5.0	NA	NA	NA	No	-2.93	982.94
Tipsico La	NA	NA	1012.72	NA	NA	NA	NA	NA	No	0.16	1012.88

NA = Not Available

NM = Not Measured

† Casing diameter prevents measurement

@ Insufficient flow into well

# Well not in aquifer

\*\* Pumping equipment prevents water level measurement

Table 2  
Summary of Volatile Organic Compound Analytical Results in Groundwater Samples  
Rose Township Demode Road Site  
Holly, Michigan  
Samples Collected April 18 through 27  
Earth Tech Project No. 89861.02

Volatile Organic Compound	ROD Target Cleanup Levels <sup>A</sup>		2004 Federal Drinking Water Maximum Contaminant Levels in µg/L	MDEQ Part 201 Generic Cleanup Criteria Concentration in µg/L			Sample Location Identification Concentration in µg/L															
	Phase I Target Concentration Limits in µg/L	Phase II Target Concentration Limits in µg/L		Residential Drinking Water Criteria	Groundwater Surface Water Interface Criteria	Groundwater Contact Criteria	DNR-1	DNR-4D	DNR-6	DNR-6 BLAD. PUMP	DNR-7	GW-4D	GW-5I	GW-6D	GW-17D	GW-17I	GW-18	GW-19D	GW-19S	GW-20D	GW-20I	GW-21D
Acetone	---	---	---	730	1,700	31,000,000	ND (25)	ND (25)	ND (25)	ND (25)	ND (50)	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)
Benzene	1.5	0.133	5	5	200	11,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (2.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Carbon Disulfide	---	---	---	800	ID	1,200,000	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (10)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)
Chlorobenzene	60	60	100	100	47	86,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (2.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Chloroform	---	---	---	80	170	150,000	ND (1.0)	ND (1.0)	4.4	4.6	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Chloroethane	---	---	---	430	ID	440,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	30	ND (1.0)	1.8	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1,1-Dichloroethane	---	---	---	880	740	2,400,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	6.4	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1,1-Dichloroethene	---	---	7	7	65	11,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (2.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
cis-1,2-Dichloroethene	---	---	70	70	620	200,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	230	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
trans-1,2-Dichloroethene	---	---	100	100	1500	220,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	27	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Ethylbenzene	680	680	700	74	18	170,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (2.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Tetrahydrofuran	---	---	---	95	11,000	1,600,000	ND (10)	ND (10)	ND (10)	ND (10)	ND (20)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)
Toluene	---	---	1,000	790	140	530,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Trichloroethene	1.5	0.627	5	5	200	22,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (2.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1,1,1-Trichloroethane	---	---	200	200	200	1,300,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (2.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Vinyl Chloride	1	0.003	2	2	15	1,000	ND (1.0)	ND (1.0)	30	38	120	ND (1.0)	160	12	20	19	38	ND (1.0)	7.5	26	ND (1.0)	ND (1.0)

Notes:  
ROD -Record of Decision, EPA September 30, 1987  
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MDEQ -Michigan Department of Environmental Quality  
ID -Inadequate data for MDEQ to develop criterion.  
ND (1.0) -Not detected above the analytical method reporting limits. The analytical method reporting limits are included in parenthesis.  
µg/L -Micrograms per liter  
--- -No standard available  
380 -Indicates an exceedance of one or more criteria ( ROD Target Cleanup Levels, MCLs, MDEQ Part 201)

Table 2  
Summary of Volatile Organic Compound Analytical Results in Groundwater Samples  
Rose Township Demode Road Site  
Holly, Michigan  
Samples Collected April 18 through 27  
Earth Tech Project No. 89861.02

Volatile Organic Compound	ROD Target Cleanup Levels <sup>A</sup>		2004 Federal Drinking Water Maximum Contaminant Levels in µg/L	MDEQ Part 201 Generic Cleanup Criteria Concentration in µg/L				Sample Location Identification Concentration in µg/L															
	Phase I Target Concentration Limits in µg/L	Phase II Target Concentration Limits in µg/L		Residential Drinking Water Criteria	Groundwater Surface Water Interface Criteria	Groundwater Contact Criteria		GW-21S	GW-22D	GW-22I	GW-22S	GW-23D	GW-23I	GW-23S	GW-24D	GW-24I	GW-25D	GW-25I	GW-26D	GW-26D BLAD. PUMP	GW-26I	MW-102D	MW103S
Acetone	---	---	---	730	1,700	31,000,000	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)
Benzene	1.5	0.133	5	5	200	11,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Carbon Disulfide	---	---	---	800	ID	1,200,000	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	7.0	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)
Chlorobenzene	60	60	100	100	47	86,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Chloroform	---	---	---	80	170	150,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Chloroethane	---	---	---	430	ID	440,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1,1-Dichloroethane	---	---	---	880	740	2,400,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1,1-Dichloroethene	---	---	7	7	65	11,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
cis-1,2-Dichloroethene	---	---	70	70	620	200,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	2.5
trans-1,2-Dichloroethene	---	---	100	100	1500	220,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Ethylbenzene	680	680	700	74	18	170,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Tetrahydrofuran	---	---	---	95	11,000	1,600,000	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)
Toluene	---	---	1,000	790	140	530,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	1.6	1.4	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Trichloroethene	1.5	0.627	5	5	200	22,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1,1,1-Trichloroethane	---	---	200	200	200	1,300,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Vinyl Chloride	1	0.003	2	2	15	1,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)

Notes

ROD -Record of Decision, EPA September 30, 1987

A -Phase I and Phase II TCLs as identified in the Remedial Design and Remedial Action Work Plan (Fred C. Hart Associates, Inc., et al, September 18, 1989).

MDEQ -Michigan Department of Environmental Quality

ID -Inadequate data for MDEQ to develop criterion.

ND (1.0) -Not detected above the analytical method reporting limits. The analytical method reporting limits are included in parenthesis.

µg/L -Micrograms per liter

--- -No standard available

300 -Indicates an exceedance of one or more criteria ( ROD Target Cleanup Levels, MCLs, MDEQ Part 201)

Table 2  
Summary of Volatile Organic Compound Analytical Results in Groundwater Samples  
Rose Township Demode Road Site  
Holly, Michigan  
Samples Collected April 18 through 27  
Earth Tech Project No. 89861.02

Volatile Organic Compound	ROD Target Cleanup Levels <sup>A</sup>		2004 Federal Drinking Water Maximum Contaminant Levels in µg/L	MDEQ Part 201 Generic Cleanup Criteria Concentration in µg/L								
	Phase I Target Concentration Limits in µg/L	Phase II Target Concentration Limits in µg/L		Residential Drinking Water Criteria	Groundwater Surface Water Interface Criteria	Groundwater Contact Criteria		MW-3I	PW-7	PW-8	RW-1D	RW-1D BLAD. PUMP
Acetone	---	---	---	730	1,700	31,000,000	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)
Benzene	1.5	0.133	5	5	200	11,000	ND (1.0)	7.3	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Carbon Disulfide	---	---	---	800	ID	1,200,000	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)
Chlorobenzene	60	60	100	100	47	86,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	29
Chloroform	---	---	---	80	170	150,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Chloroethane	---	---	---	430	ID	440,000	ND (1.0)	3.3	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1,1-Dichloroethane	---	---	---	880	740	2,400,000	ND (1.0)	5.8	ND (1.0)	ND (1.0)	ND (1.0)	1.1
1,1-Dichloroethene	---	---	7	7	65	11,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
cis-1,2-Dichloroethene	---	---	70	70	620	200,000	ND (1.0)	56	ND (1.0)	12	12	ND (1.0)
trans-1,2-Dichloroethene	---	---	100	100	1500	220,000	ND (1.0)	24	ND (1.0)	31	33	ND (1.0)
Ethylbenzene	680	680	700	74	18	170,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	6
Tetrahydrofuran	---	---	---	95	11,000	1,600,000	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)
Toluene	---	---	1,000	790	140	530,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Trichloroethene	1.5	0.627	5	5	200	22,000	ND (1.0)	ND (1.0)	3.0	140	150	ND (1.0)
1,1,1-Trichloroethane	---	---	200	200	200	1,300,000	ND (1.0)	9.8	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Vinyl Chloride	1	0.003	2	2	15	1,000	7.25	100	4.3	ND (1.0)	ND (1.0)	1.7

Notes:  
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MDEQ -Michigan Department of Environmental Quality  
ID -Inadequate data for MDEQ to develop criterion.  
ND (1.0) -Not detected above the analytical method reporting limits. The analytical method reporting limits are included in parenthesis.  
µg/L -Micrograms per liter  
--- -No standard available  
7.25, 100, 4.3, 1.7 -Indicates an exceedance of one or more criteria ( ROD Target Cleanup Levels, MCLs, MDEQ Part 201)

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2008



Table 3  
Summary of Historical Volatile Organic Compound (VOC) Analytical Results  
Rose Township Demoda Road Site  
Holly, Michigan  
Rose Township

Sample Location	Date Sampled	Parameters																																				
		Vinyl Chloride	TCE	Cis-1,2-DCE	Benzene	Chlorobenzene	1,1,1-TCA	1,1,2-TCA	1,1-DCA	1,1-DCE	1,2-DCA	1,3-Dichloropropane	2,4-Dimethylphenol	2-Butanone (MEK)	2-Hexanone	Acetone	Bis (2-ethylhexyl) phthalate	Bromo-dichloromethane	Carbon Disulfide	Carbon Tetrachloride	Chloroethane	Chloroform	Di-n-butylphthalate	Di-n-octylphthalate	Ethylbenzene	Ethylene	Isophorone	Methylene Chloride	Naphthalene	n-Nitrosodiphenylamine	Phenol	PCE	Tetrahydrofuran	Toluene	trans-1,2-DCE	Xylenes (Total)		
RW-3	9/30/1996	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	ND	18	ND	8	8	--	--	ND	ND	--	ND	ND	ND	--	ND	ND	ND	ND	ND	--	ND	ND	1	ND	ND		
RW-3	6/12/1991	ND	ND	--	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND	--	ND	
RW-4	9/30/1996	ND	38	--	ND	ND	18	ND	8	ND	--	ND	18	ND	4	3	--	--	ND	ND	--	ND	ND	ND	--	ND	ND	ND	ND	ND	--	ND	ND	1	19	ND	ND	
RW-4	11/23/1993	ND	7.1	--	ND	ND	2.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND	--	ND	
RW-5D	10/1/1996	88	ND	--	2	ND	ND	ND	7	ND	ND	--	ND	19	ND	4	4	--	--	ND	3	--	ND	ND	ND	--	3	1	ND	ND	--	ND	ND	1	2	ND	ND	
RW-5D (dup)	10/1/1996	1450	71	--	170	190	48	ND	680	9	ND	--	ND	83	ND	81	3	--	--	8	6	--	ND	ND	ND	--	19	8	ND	ND	--	ND	ND	63	710	72		
RW-5D	12/29/1993	170	ND	--	140	180	ND	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	580	--	130	
RW-5D	1/11/1994	33	ND	--	30	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3	--	ND	
RW-5D	8/18/1994	180	3.4	--	180	100	2.8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	110	--	87	
RW-5D (dup)	8/18/1994	18	ND	--	18	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.7	--	ND	
RW-5S	12/1/2003	24	22	11	6.3	89	3.9	ND	8.2	1.8	ND	ND	--	ND	ND	ND	--	--	ND	ND	ND	ND	--	--	6.9	ND	--	ND	--	--	--	--	ND	--	1.9	ND	6.7	
RW-5S (dup)	12/1/2003	28	24	12	6.8	97	4.2	ND	8.1	1.8	ND	ND	--	ND	ND	ND	--	--	ND	ND	ND	ND	--	--	6.3	ND	--	ND	--	--	--	--	ND	--	1.9	ND	6.7	
RW-5S	3/10/2004	34	26	13	8.1	79	4.8	ND	11	2.3	ND	ND	--	ND	ND	ND	--	--	ND	ND	ND	ND	--	--	6.2	8.6	--	ND	--	--	--	--	ND	ND	ND	ND	ND	
RW-5S	6/24/2004	19	12	4.8	1.1	76	3.8	ND	3.1	1.2	ND	ND	--	ND	ND	ND	--	--	ND	ND	ND	ND	--	--	11	ND	--	ND	--	--	--	--	ND	ND	ND	ND	ND	
RW-5S	12/7/2004	3.8	3.3	1.8	ND	48	1.8	ND	1.8	ND	ND	ND	--	ND	ND	ND	--	--	ND	ND	ND	ND	--	--	7.4	ND	--	ND	--	--	--	--	ND	ND	ND	ND	ND	
RW-5S	4/20/2005	ND	1.2	ND	ND	83	ND	ND	1.3	ND	ND	ND	--	ND	ND	ND	--	--	ND	ND	ND	ND	--	--	6.9	ND	--	ND	--	--	--	--	ND	ND	ND	ND	ND	
RW-5S	8/23/2005	3.3	ND	ND	ND	19	ND	ND	ND	ND	ND	ND	--	ND	ND	ND	--	--	ND	ND	ND	ND	--	--	2.9	ND	--	ND	--	--	--	--	ND	ND	ND	ND	ND	
RW-5S	9/21/2005	6.0	1.4	ND	ND	20	ND	ND	ND	ND	ND	ND	--	ND	ND	ND	--	--	ND	ND	ND	ND	--	--	2.9	ND	--	ND	--	--	--	--	ND	ND	ND	ND	ND	
RW-5S	12/7/2005	3.4	1.8	<1.0	<1.0	22	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	--	<25	<50	<25	--	<1.0	<5.0	<1.0	<1.0	<1.0	--	--	2.8	<1.0	--	<5.0	--	--	--	<1.0	<1.0	<1.0	<1.0	<3.0		
RW-5S (dup)	12/7/2005	2.4	1.1	<1.0	<1.0	22	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	--	<25	<50	<25	--	<1.0	<5.0	<1.0	<1.0	<1.0	--	--	2.7	<1.0	--	<5.0	--	--	--	<1.0	<1.0	<1.0	<1.0	<3.0		
RW-5S	4/25/2006	1.7	<1.0	<1.0	<1.0	29	<1.0	<1.0	1.1	<1.0	<1.0	<1.0	--	<25	<50	<25	--	<1.0	<5.0	<1.0	<1.0	<1.0	--	--	6.0	--	--	<5.0	--	--	--	<1.0	<1.0	<1.0	<1.0	<3.0		
RW-6	10/1/1996	ND	350	--	28	179	7	31	19	ND	10	--	2	30	ND	18	6	--	--	ND	ND	--	ND	ND	ND	--	28	3	ND	ND	--	ND	ND	2	660	ND		
RW-6	6/14/1991	3	130	--	16	339	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND	--	ND
RW-6	12/13/1993	12	84	--	8.4	239	1.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND	--	ND
RW-6	12/13/1993	ND	ND	--	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND	--	ND
RW-6D	10/1/1996	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	--	ND	21	ND	8	8	--	--	ND	ND	--	ND	ND	ND	--	ND	ND	ND	ND	--	ND	ND	ND	ND	ND	ND	
RW-6D	12/13/1993	ND	ND	--	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND	--	ND
RW-7	10/2/1996	ND	1,200	--	ND	3,300	ND	ND	ND	ND	ND	--	ND	13,000	ND	8,300	18	--	--	ND	ND	--	ND	ND	ND	--	ND	ND	ND	ND	--	ND	ND	86,000	ND	35,000		
RW-7	12/10/1993	780	ND	--	23	660	ND	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4,900	--	4,100	
RW-7	4/6/1995	180	ND	--	ND	220	ND	--	--	--	--	--	--	--	--	--	ND	--	--	--	--	--	--	--	--	600	--	ND	ND	23	--	--	--	2,600	--	2,100		
RW-8	9/30/1996	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	--	ND	18	ND	8	3	--	--	ND	ND	--	ND	ND	ND	--	ND	--	ND	ND	--	ND	ND	2	ND	ND		
RW-8	11/23/1993	ND	ND	--	1.8	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND	--	ND
RW-8D	10/1/1996	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	--	ND	18	ND	3	8	--	--	ND	ND	--	ND	ND	ND	--	ND	ND	ND	ND	--	ND	ND	ND	ND	ND	ND	
RW-8D (dup)	10/1/1996	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	--	ND	18	ND	3	8	--	--	ND	ND	--	ND	ND	ND	--	ND	ND	ND	ND	--	ND	ND	1	ND	ND		
RW-8D	11/23/1993	ND	ND	--	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND	--	ND
RW-9	10/2/1996	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	--	--	8	--	--	3	--	--	--	ND	--	ND	ND	ND	--	ND	--	ND	ND	--	ND	ND	ND	ND	ND	ND	ND

Notes:  
All units are in micrograms per liter (u/L).  
"--" indicates that the compound was not analyzed.  
"ND" indicates not detected above the laboratory reporting limit (detection limit not available).  
"<" indicates less than the laboratory reporting limit shown.  
"(dup)" indicates that the sample is a duplicate collected for quality assurance purposes.  
"(dup)" indicates that a duplicate sample was collected using a bladder pump (for comparison) instead of a peristaltic pump (original sample collected with peristaltic pump).  
Analytes were analyzed via USEPA Method 8260 for volatile organic compounds.

TCE - Trichloroethene  
Cis-1,2-DCE = Cis-1,2-Dichloroethane

**Table 4**  
**Summary of Biogeochemical and Field Parameters in Groundwater Samples**  
**Rose Township Demode Road Site**  
**Holly, Michigan**  
**Samples Collected April 18 through 27, 2006**  
**Earth Tech Project No. 89861.04**

Biogeochemical and Field Parameters	Units	Sample Locations Concentrations in Units Shown																				
		DNR-1	DNR-4D	DNR-6	DNR-7	GW-4D	GW-5I	GW-6D	GW-17I	GW-17D	GW-18	GW-18S	GW-19D	GW-20I	GW-20D	GW-21S	GW-21D	GW-22S	GW-22I	GW-22D	GW-23S	GW-23I
Field Parameters																						
pH	S.U.	7.65	8.02	7.88	7.57	7.67	7.56	7.53	7.55	7.56	7.53	7.51	7.52	7.49	7.54	7.48	7.65	8.40	7.50	7.94	7.54	8.04
Conductivity	µS/cm	512	584	380	568	601	590	591	585	588	593	6.4*	606	617	581	630	543	334	598	317	592	580
Dissolved Oxygen	mg/L	0.28	0.23	1.52	0.17	0.22	0.69	0.29	0.19	0.28	0.26	0.28	0.08	0.25	0.11	0.18	0.11	0.16	0.22	1.78	0.41	0.15
Temperature	C°	9.76	9.89	13.30	10.15	10.70	9.53	9.62	9.60	9.73	9.69	9.81	10.08	9.60	9.89	9.64	9.68	12.60	11.50	10.73	10.10	10.72
Oxidation/Reduction Potential	mv	31	64	169	46	41	79	43	58	48	53	56	36	62	45	45	7	-13	31	143	68	-111
Salinity	PSS	0.24	0.28	0.18	0.27	0.29	0.28	0.28	0.28	0.28	0.29	0.28	0.29	0.30	0.28	0.30	0.26	0.16	0.29	0.15	0.28	0.28
Turbidity	NTU	221*	17.00	8.00	10.00	15.00	8.00	9.00	7.00	8.00	8.00	0	0	0	0	0	0	NA	NA	NA	6.63	NA
Sulfide	mg/L	0.68	0.59	0.68	0.64	0.26	0.07	0.01	0.01	0.08	0.00	0.01	0.02	0.00	0.03	0.01	0.06	0.08	0.02	0.06	0.02	0.69
Dissolved Iron	mg/L	3.28	1.01	0.86	2.13	2.21	1.48	0.35	1.70	2.28	1.76	1.72	1.65	1.68	1.84	1.67	1.11	0.24	2.35	1.60	2.20	0.18
Dissolved Manganese	mg/L	3.70	1.50	2.10	0.30	0.80	0.60	1.90	0.60	0.70	0.70	0.00	0.20	0.30	0.20	0.20	0.90	0.20	0.30	1.60	0.20	0.60
Biogeochemical Parameters																						
Nitrogen, Ammonia	mg/L	0.28	0.058	ND (0.05)	0.06	0.12	0.18	0.082	0.12	0.12	0.13	0.056	0.11	0.12	0.12	0.13	0.2	0.1	0.11	ND (0.05)	0.14	ND (0.05)
Total Organic Carbon	mg/L	1.7	2.7	14	2.3	1.5	1.5	1.2	1.3	1.3	1.3	1.4	1.3	1.3	1.4	1.3	1.1	1.1	1.3	2.3	1.3	1.4
Nitrogen, Nitrate	mg/L	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	0.093	ND (0.05)	ND (0.05)
Nitrogen, Nitrite	mg/L	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Sulfate	mg/L	ND (5.0)	18	22	8.6	24	17	21	14	10	13	29	ND (5.0)	18	13	27	18	28	17	21	23	8.4
Chloride	mg/L	1.7	5	8.9	5.8	2.5	4.2	2.8	3.8	2.5	2.9	4.1	4.2	4.6	2.8	5.8	1.7	2.4	2.5	3.6	2.9	7.2
Total Alkalinity	mg/L	280	300	180	290	290	290	290	300	300	300	290	290	310	300	310	300	150	300	150	290	300
Dissolved Gases																						
Ethane Gas in Water	µg/L	ND (2.0)	ND (1.0)	ND (1.0)	ND (10)	ND (1.0)	ND (4.0)	ND (1.0)	ND (4.0)	ND (2.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (10)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Ethane Gas in Water	µg/L	ND (2.0)	ND (1.0)	ND (1.0)	ND (10)	ND (1.0)	ND (4.0)	ND (1.0)	ND (4.0)	ND (2.0)	ND (1.0)	1.8	ND (1.0)	ND (1.0)	2.9	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	1.6
Methane Gas in Water	µg/L	70	19	48	160	8.9	140	3.8	86	58	31	11	1.6	7.8	78	3.9	14	16	1.9	ND (0.5)	3.2	8.2

Notes:  
 ND (5.0) -Not detected above analytical method reporting limits. The analytical method reporting limits are listed in parentheses.  
 S.U. -Standard units  
 NTU -Nephelometric turbidity units  
 µS/cm -MicroSiemens per centimeter  
 mg/L -Milligram per liter  
 µg/L -Microgram per liter  
 C° -Degrees Celsius  
 mv -Millivolt  
 PSS -Practical Salinity Scale  
 NA -Not available  
 \* -Anomalous data; The anomaly for the turbidity reading is attributed to low batteries (batteries were replaced).

**Table 4**  
**Summary of Biogeochemical and Field Parameters in Groundwater Samples**  
**Rose Township Demode Road Site**  
**Holly, Michigan**  
**Samples Collected April 18 through 27, 2006**  
**Earth Tech Project No. 89861.04**

Biogeochemical and Field Parameters	Units														
		GW-23D	GW-24I	GW-24D	GW-25I	GW-25D	GW-26I	GW-26D	MW-3I	MW-102D	MW-103S	PW7	PW8	RW-1D	RW-6S
Field Parameters															
pH	S.U.	7.94	7.99	7.67	7.52	7.51	7.48	8.01	7.62	8.09	7.56	7.59	7.39	7.62	7.56
Conductivity	µS/cm	570	550	607	584	625	586	379	807	456	601	510	0.001*	556	848
Dissolved Oxygen	mg/L	0.27	0.25	0.25	0.19	0.22	1.14	0.14	0.45	0.23	0.45	2.19	1.41	1.41	0.33
Temperature	C°	10.77	9.55	9.17	10.34	10.40	12.60	12.23	9.67	10.09	10.43	11.39	11.97	8.91	9.93
Oxidation/Reduction Potential	mv	-72	-43	-5	41	34	155	-117	65	71	71	66	154	64	31
Salinity	PSS	0.27	0.28	0.29	0.28	0.30	0.28	0.18	0.29	0.22	0.29	0.24	0.01	0.28	0.31
Turbidity	NTU	5.62	6.61	9.02	18.00	15.00	9.00	10.00	17.00	9.37	10.00	6.67	7.00	10.00	9.00
Sulfide	mg/L	0.78	0.50	0.13	0.04	0.00	0.01	0.07	0.29	0.13	0.10	0.01	0.01	0.65	0.05
Dissolved Iron	mg/L	0.11	0.15	1.38	2.07	2.56	0.24	1.04	2.44	0.38	1.40	2.14	0.55	1.90	2.88
Dissolved Manganese	mg/L	0.30	0.10	0.40	1.10	1.60	0.60	1.30	0.20	1.60	1.20	0.30	0.40	0.60	1.00
Biogeochemical Parameters															
Nitrogen, Ammonia	mg/L	0.12	0.17	0.14	0.12	ND (0.05)	0.13	0.17	0.092	0.07	0.16	0.15	NA	0.17	NA (0.05)
Total Organic Carbon	mg/L	1.3	1.6	1.4	1.9	1.5	1.5	4.8	1.6	1.2	1.8	1.8	NA	1.7	1.2
Nitrogen, Nitrate	mg/L	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	NA	ND (0.05)	ND (0.05)
Nitrogen, Nitrite	mg/L	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	NA	ND (0.05)	ND (0.05)
Sulfate	mg/L	ND (5.0)	5.2	18	13	24	18	17	17	ND (5.0)	18	8.6	NA	ND (5.0)	23
Chloride	mg/L	4.1	3.4	3.6	2.3	4.1	2.4	17	4.1	1.7	4.9	4.2	NA	8	5.1
Total Alkalinity	mg/L	310	280	300	300	300	300	160	310	260	300	290	NA	290	310
Dissolved Gases															
Ethane Gas in Water	µg/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	9.3	ND (1.0)	ND (5.0)	ND (1.0)	ND (5.0)	NA	ND (1.0)	ND (1.0)
Ethane Gas in Water	µg/L	2.4	3.6	2.5	ND (1.0)	ND (1.0)	ND (1.0)	2.1	ND (1.0)	ND (5.0)	ND (1.0)	14	NA	ND (1.0)	ND (1.0)
Methane Gas in Water	µg/L	24	8.1	2.8	1.8	2.1	1.5	14	13	180.0	8.6	180	NA	30	ND (0.50)

Notes:  
ND (5.0) -Not detected above analytical method report  
S.U. -Standard units  
NTU -Nephelometric turbidity units  
µS/cm -MicroSiemens per centimeter  
mg/L -Milligram per liter  
µg/L -Microgram per liter  
C° -Degrees Celsius  
mv -Millivolt  
PSS -Practical Salinity Scale  
NA -Not available  
\* Anomalous data. The anomaly for the turbidity